### Table 10.1 Seven Traits of Mendel’s Pea Plants

<table>
<thead>
<tr>
<th>Trait</th>
<th>Dominant Allele</th>
<th>Recessive Allele</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>Tall</td>
<td>Dwarf</td>
</tr>
<tr>
<td>Seed color</td>
<td>Yellow</td>
<td>Green</td>
</tr>
<tr>
<td>Seed shape</td>
<td>Round</td>
<td>Angular (wrinkled)</td>
</tr>
<tr>
<td>Flower color</td>
<td>Purple</td>
<td>White</td>
</tr>
<tr>
<td>Flower position</td>
<td>Along stem</td>
<td>At stem tips</td>
</tr>
<tr>
<td>Pod color</td>
<td>Green</td>
<td>Yellow</td>
</tr>
<tr>
<td>Pod shape</td>
<td>Inflated</td>
<td>Constricted</td>
</tr>
</tbody>
</table>

Table 10-1 Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Homologous chromosome pair (BbWw) before meiosis.

Gray body
Black body

Long wings
Short wings

Replication and tetrad formation

Crossover

Homologous chromosome pair in tetrad formation

Normal gamete (BW)
Crossover gamete (bW)
Normal gamete (bw)
Crossover gamete (Bw)

Figure 10-7 Cell and Molecular Biology, 4/e © 2005 John Wiley & Sons
Homologous chromosome pair in tetrad formation
Homologous chromosome pair (BbWw) (before meiosis)

Gray body: B W
Black body: b w

Long wings: B W
Short wings: b w
Replication and tetrad formation
Crossover

Meiosis

Normal gamete (BW)
Crossover gamete (bW)
Normal gamete (bw)
Crossover gamete (Bw)

Figure 10-7b Cell and Molecular Biology, 4/e © 2005 John Wiley & Sons
Single DNA molecule

Band

Figure 10-8a Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Phosphate

Sugar

Base

Nucleoside (deoxyadenosine)

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Figure 10-11 Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Nucleus
Figure 10-14c Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
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Figure 10-18 Cell and Molecular Biology, 4/e © 2005 John Wiley & Sons
Figure 10-19  Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Mitotic chromosome

Glass slide

Double-stranded DNA

Treat slide with hot salt solution to denature DNA

Single-stranded DNA

Incubate with biotinylated DNA probe, then wash to remove unhybridized DNA. In this example, satellite DNA is employed.

Double-stranded DNA hybrid

Incubate with fluorescently labeled avidin to reveal location of bound, labeled DNA probe. Counterstain chromosomes so they appear red.

Localization of satellite DNA in centromeres
Mitotic chromosome

Glass slide

Double-stranded DNA

Single-stranded DNA

Treat slide with hot salt solution to denature DNA
Incubate with biotinylated DNA probe, then wash to remove unhybridized DNA. In this example, satellite DNA is employed.

Single-stranded DNA

Double-stranded DNA hybrid
Double-stranded DNA hybrid

Incubate with fluorescently labeled avidin to reveal location of bound, labeled DNA probe. Counterstain chromosomes so they appear red.

Localization of satellite DNA in centromeres
5' UTR | Intron | Coding exon | Intron | 3' UTR

- CGG Fragile X syndrome
- GAA Friedreich's ataxia
- Type 1 diseases CAG/polyglutamine e.g. Huntington's disease
- CTG Myotonic dystrophy

HP-1 Figure 10-1  Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Figure 10-23  Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Figure 10-23a Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Unequal crossover

Figure 10-23b  Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
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Figure 10-25 part 2 Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Target DNA +

Target capture

Integration
Recipient DNA

AATTC TTAAG

Transposon inserts into recipient DNA

AATTC TTAAG

Transposon

GGGGTCTCG CCCCCAGAC

CAGACCCCC GTCTGGGGG

= Direct repeat in recipient DNA

= Inverted repeat at ends of transposon
Donor DNA with retrotransposon

RNA

Transcription by RNA polymerase

Reverse transcription to form single-stranded cDNA

cDNA

Conversion to double-stranded DNA

DNA

Recipient DNA

Donor DNA with retrotransposon
Human chromosome 12
Human
Chimpanzee
Baboon
Rhesus monkey
Green monkey
Colobus monkey
Dusky titi
Spider monkey
Shadowed regions

Sequence elements conserved in all species

Nucleotide differences in at least one species

Figure 10-31 Cell and Molecular Biology, 4/e (© 2005 John Wiley & Sons)
Shear off adsorbed particles in blender

Phage progeny produced from bacteria despite loss of adsorbed phage coats. Considerable % of original radioactivity present in progeny

~ 80% of radioactivity

Unlabeled protein
Labeled protein
Unlabeled DNA
Labeled DNA

Shear off adsorbed particles in blender

~ 20% of radioactivity

Less than 1% of radioactivity transferred to progeny

~ 80% of radioactivity

~ 20% of radioactivity

(a)

(b)